
Wnt-mediated self-renewal of neural stem/progenitor cells.

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Public Summary:

Scientific Abstract:

In this work we have uncovered a role for Wnt signaling as an important regulator of stem cell self-renewal in the developing brain. We identified Wnt-responsive cells in the subventricular zone of the developing E14.5 mouse brain. Responding cell populations were enriched for self-renewing stem cells in primary culture, suggesting that Wnt signaling is a hallmark of self-renewing activity in vivo. We also tested whether Wnt signals directly influence neural stem cells. Using inhibitors of the Wnt pathway, we found that Wnt signaling is required for the efficient cloning and expansion of single-cell derived populations that are able to generate new stem cells as well as neurons, astrocytes, and oligodendrocytes. The addition of exogenous Wnt3a protein enhances clonal outgrowth, demonstrating not only a critical role for the Wnt pathway for the regulation of neurogenesis but also its use for the expansion of neural stem cells in cell culture and in tissue engineering.

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